Project Acronym: EDU-MENT
Project title: Education in Mental Health for Nurses in Home and Residential Care

Specification report for the screening tool

Project ref no:	KA220-VET-2FD42AAD
Project acronym:	EDU-MENT
Project full title:	Education in Mental Health for Nurses in Home and Residential Care
Nature:	
Dissemination level:	Public
Due date of deliverable:	30/06/2024
Actual submission date:	30/04/2025
Deliverable name:	Specification report for the screening tool
Status:	Final
WP contributing to the deliverable:	**WP3 - Development, test, digitalization, and evaluation of screening tools**
Lead partner for this deliverable:	Agecare (Cyprus) Ltd
Author(s):	AgeCare
Contributing Partners:	UCY

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or OeAD-GmbH. Neither the European Union nor the granting authority can be held responsible for them.

Version History

Version	Edited by	Date	Description of edits performed
1	AgeCare	5/11/0224	Draft
2	AgeCare	11/3/2025	Draft
3	AgeCare	10/4/2025	Draft
4	UCY	29/4/2025	Suggestions
5	AgeCare	30/4/2025	Fine tunes

Πίνακας περιεχομένων

1 Introduction and background 5

2 Theoretical foundation 6

2.1 Factors associated with mental health in old age 6

2.2 Level A categorization: Domains of factors 7

2.3 Level B categorization: Symptoms or risks 8

2.4 Level C categorization: Symptom and risk combinations 9

2.5 Reasoning for categorisation 10

3 Structure and content of the tool 10

3.1 Overview of steps 10

3.1.1 Step 1. Checklist items and answers 11

3.1.2 Step 2. Further Assessments 19
3.1.3 Topic A. Demographic Characteristics 20

4 Field of application 25

4.1 Ethics Considerations 25

5 Technical requirements 26

5.1 User-friendly features 26

5.2 Design of the digital screening tool 27

5.3 Technical Development 29

6 Evaluation and development requirements 29

7 References 30

Figure 1 Screening tool's modules and workflow 28

1 Introduction and background

The development of a digital screening tool to evaluate mental health in residential and homecare settings represents a significant change that aims to support registered nurses (RNs) in their roles. who have met all the necessary educational and licensing requirements to practice nursing play a primary role in providing both direct and indirect care to individuals in need, their families, and populations across various settings. Given the regulatory framework controlled by each countries' general health legislations and related regulations, these professionals are required to maintain high standards of professional qualifications and training. The primary goal of WP3 is to develop, test, and digitise existing mental health screening tools, or create new ones that are both useful and easy to use for RNs in their daily routines. The acceptance of these tools among healthcare professionals is critical, with perceived usefulness and ease of use being key parameters for success. The design of these tools is informed by the findings from previous work packages, thereby ensuring a design process that is both reliable and supported by data. RNs will use these digital tools to assess mental health and stress levels in care settings effectively. The objective of this project is to promote mental well-being in a way that is both sustainable and effective in addressing mental stress among patients. The results of this project will be used to establish standards for mental healthcare, allowing for the development of qualifications for caregivers from various professions. Additionally, the findings will contribute to the improvement of organizational effectiveness in home care and long-term care facilities. The integration of these tools is intended to enhance the quality of mental healthcare and support registered nurses (RNs) in delivering patient-centered care.

The objective of this document is to outline the procedure for creating the screening tool, the digital transformation process, and the following steps for its evaluation. This document is associated with the "D3.5 Evaluate and improve the digital screening tools based on user feedback" which will include the results from testing the screening tool with nurses in Austria, Cyprus and Slovenia with 30 RNs.

2 Theoretical foundation

2.1 Factors associated with mental health in old age

The mental health of older adults is influenced by a complex interplay of multifaceted parameters. According to the results of WP2, these parameters can be categorized into several domains, each of which contributes to mental well-being in a unique way. A variety of demographic factors have been demonstrated to have a significant impact on mental health, including but not limited to: sex, gender, education, income, age, area of residency, living status, and minority group membership, including belonging to the LGBT+ community. Education and income levels also correlate with mental health, where lower levels are linked to increased stress and mental illness (Lorant et al., 2003). Ageing itself is a crucial factor, as it brings about physiological and social changes that can affect mental health (Jeste et al., 2016).

Health-related factors are very important when evaluating the mental well-being of older adults. For instance, the number of physical illnesses they have and the number of medications they take can affect their mental health. Their level of mobility, or how easily they can move around, also matters. Chronic diseases, which are long-lasting conditions like diabetes or heart disease, can add to mental health challenges, where people with 4 chronic conditions or more had more hospital admissions. Mental health issues that run in the family can make some older adults more likely to experience specific conditions. Having multiple illnesses often means taking several different medications at the same time, a situation known as polypharmacy. Polypharmacy can sometimes cause negative effects on mental health. When older adults take many medications together, there's a higher chance of experiencing side effects, drug interactions, or even confusion about their prescriptions. These issues can lead to symptoms like mood changes, memory problems, or increased feelings of anxiety and depression.

Cognitive and psychological factors, including memory problems, difficulties in financial management, loss of loved ones, decision-making challenges, trauma, speech or language difficulties, confusion or delirium, and hallucinations, also play a significant role. Cognitive decline and psychological stressors can severely affect an older adult's quality of life and mental health (Lyketsos et al., 2002). These factors can result in a reduced capacity to manage daily activities and make informed decisions, which can lead to elevated stress levels and the development of potential mental health concerns.

Behavioural and lifestyle factors, such as irregular sleep patterns, significant weight changes, social interactions (friends and going out), substance use (alcohol, tobacco, and drugs), hobbies, and exercise, are closely linked to mental health. Maintaining an

active lifestyle and social connections have a significant role in reducing the likelihood of mental health issues and promote a sense of well-being.

Environmental and personal hygiene factors further influence mental health. Maintaining a clean and tidy living space, avoiding hoarding behaviours, and caring for personal appearance are crucial. Personal appearance can also impact self-esteem and social interactions, affecting overall mental well-being. By addressing these parameters holistically, it is possible to develop comprehensive screening tools that effectively identify and address mental health issues in residential and homecare settings.

2.2 Level A categorization: Domains of factors

The factors influencing mental health in older adults can be categorized into distinct domains, each consisting of various demographic, medical, lifestyle, and socio-political factors. A complete understanding of these domains provides a comprehensive framework for assessing their impact on mental well-being.

Demographic Factors

Demographic factors include age, gender, sex, education, income, and area of residency. Older age is often associated with increased vulnerability to mental health challenges due to cognitive changes and social transitions (Luppa et al., 2010). Sex differences influence mental health outcomes, with women typically experiencing higher rates of depression and anxiety (Salk et al., 2017).

Medical Factors

Medical factors encompass chronic diseases, medication use, mobility issues, and hereditary conditions. Polypharmacy, the use of multiple medications, poses risks due to interactions and side effects impacting mental well-being (Maher et al., 2014). Mobility limitations reduce social interactions and independence, contributing to feelings of isolation and depression (Covinsky et al., 2011).

Lifestyle Factors

Lifestyle factors include sleep patterns, nutrition, substance use, and physical activity. Irregular sleep patterns and poor nutrition are associated with increased risk of mental health disorders (Zisberg et al., 2010).

Environmental Factors

Environmental factors such as living conditions, personal hygiene, and social support networks play crucial roles in mental health. Conversely, social isolation and inadequate support networks contribute to loneliness and depression among older adults.

Socio-political Context

The socio-political context includes factors such as socio-economic status, minority status, and LGBT+ identity. Socio-economic disparities impact mental health outcomes, with lower income and education levels correlating with higher levels of stress and limited access to mental health services (Lorant et al., 2003).

2.3 Level B categorization: Symptoms or risks

Understanding the parameters influencing mental health in older adults involves recognizing their varying degrees of impact, influenced by both the nature of the issue and its severity. These parameters encompass both **direct symptoms** of mental health conditions and **risk factors**, each contributing differently to overall mental well-being.

Direct symptoms such as cognitive impairments (e.g., memory problems, confusion) and psychological issues (e.g., hallucinations, speech difficulties) are critical indicators of underlying neuropsychiatric conditions like dementia and depression (Lyketsos et al., 2002).

Certain **risk factors significantly impact mental health**. Chronic diseases like diabetes and heart disease not only pose physical challenges but also contribute to higher rates of depression and anxiety due to their chronic nature and associated lifestyle adjustments (Tsang et al., 2008). Similarly, polypharmacy and mobility limitations are severe risk factors that amplify mental health challenges due to their direct impact on daily living and social engagement (Maher et al., 2014; Covinsky et al., 2011).

Some parameters are considered **moderate risk factors**. Irregular sleep patterns and significant weight changes can exacerbate mental health conditions such as depression and anxiety depending on their severity (Zisberg et al., 2010). Environmental factors such as living conditions and personal hygiene practices, while less directly impactful than severe risk factors, still play a role in overall mental well-being (Frost et al., 2011).

It's crucial to note that the impact of these parameters often depends on their severity. For example, having mild insomnia may not significantly contribute to mental health disorders compared to conditions like REM sleep disorder, which may result in significant changes to the patient's sleep patterns and cognitive abilities (Boeve et al., 2007).

Similarly, moderate substance use may have less negative effects than severe addiction, which can lead to dependency and mental health issues (Volkow, 2004).

The socio-political context introduces additional complexities. Socio-economic factors like education and income levels also influence mental health by affecting access to resources and opportunities for social engagement (Lorant et al., 2003).

2.4 Level C categorization: Symptom and risk combinations

When evaluating mental health in older adults, it is essential to have a comprehensive understanding of the interactions between symptoms and risk factors. This understanding is crucial because these interactions can have a significant impact on the severity of the condition and the effectiveness of treatment strategies. Symptoms of mental health disorders frequently increase over time, indicating more severe illness.

Symptoms such as cognitive impairments (e.g., memory problems, confusion), psychological issues (e.g., hallucinations, speech difficulties), and emotional symptoms (e.g., sadness, irritability) collectively indicate the severity and complexity of underlying conditions like dementia and depression (Lyketsos et al., 2002). The presence of multiple symptoms concurrently makes managing mental health more challenging and requires comprehensive intervention strategies tailored to individual needs.

However, research indicates that, in addition to the additive effect of these factors, their combination significantly increases the likelihood and severity of mental health issues in older adults. Chronic diseases and persistent pain present a challenging combination that can significantly impact mental health. Conditions like diabetes and arthritis, coupled with chronic pain, increase the likelihood of depressive symptoms and impaired quality of life (Tsang et al., 2008). Substance use and financial instability create a cycle that worsens mental health outcomes. Older adults struggling with substance abuse and financial difficulties often experience heightened stress and social isolation, worsening their mental health challenges (Volkow, 2004;). Environmental factors such as living in cluttered or unsanitary conditions make mental health problems worse,, particularly when combined with social isolation. Hoarding behaviour, for example, correlates with increased levels of anxiety and depression due to the chaotic living environment (Frost et al., 2011; Wilson et al., 2007). Memory problems and impaired decision-making abilities significantly impact financial management and increase vulnerability to financial exploitation. Older adults with memory impairments may struggle to manage finances independently, leading to financial stress and psychological distress (Lyketsos et al., 2002). Physical health decline and substance use create combined health challenges that affect both physical and mental well-being. Chronic illnesses coupled with substance abuse can worsen symptoms of depression and anxiety, complicating treatment and recovery (Volkow, 2004; Tsang et al., 2008). Sensory impairments such as hearing and visual acuity loss, combined with limited social engagement, increases feelings of isolation and loneliness.

2.5 Reasoning for categorisation

By categorising factors into these domains, healthcare professionals can better assess and address the multifaceted influences on mental health in older adults. This structured approach helps to identify which domain(s) are most affected for a specific individual, guiding recommendations to appropriate specialists or interventions. For example, a patient experiencing significant mobility limitations and social isolation may benefit from recommendations to physiotherapy and social support services. Understanding the major domains of influence also aids in tailoring interventions, such as cognitive behavioural therapy for managing depression complicated by chronic illness.

Level B categorisation further enhances understanding by assessing the severity of each factor. For instance, identifying chronic diseases and substantial pain as severe risk factors highlights their significant impact on mental health outcomes. This differential approach directs healthcare providers towards prioritising interventions that effectively address these high-severity risks, potentially mitigating more severe mental health complications.

Level C categorisation provides additional insight by examining combinations and multiple effects of lower-severity risk factors. Although individually these factors may pose less immediate risk, their combined presence can still contribute to mental health vulnerabilities. Recognising patterns within these risk factors helps in identifying potential mental health risks early on, allowing for proactive intervention and support to prevent escalation.

3 Structure and content of the tool

3.1 Overview of steps

The screening process using our tool follows a structured sequence aimed at the comprehensive assessment and intervention for mental health in older adults.

Step 1: Checklist Completion

The initial step involves completing a checklist that encompasses essential symptoms categorised into six major domains, covering the full spectrum of possible observable psychosocial symptoms and behaviours among older adults in residential or home care settings:

Topic A. Demographic Characteristics
Topic B. Health & Comorbidities
Topic C. Cognitive & Emotional Function

<3.1>/< Specification report for the screening tool >

Topic D. Sleep & Nutrition
Topic E. Community & Lifestyle
Topic F. Personal Space & Environment

The checklist includes 44 items, each addressing different aspects of an individual's life and health. Each domain contains specific questions with multiple answer options, each associated with a severity score.

Total Items: 44

Domains and Items:

Topic A. Demographic Characteristics: 8 items
Topic B. Health & Comorbidities: 9 items
Topic C. Cognitive & Emotional Function: 7 items
Topic D. Sleep & Nutrition: 7 items
Topic E. Community & Lifestyle: 8 items
Topic F. Personal Space & Environment: 4 items

Step 2: Further Assessment

Further assessment, if needed, will appear at the end of the checklist with the following five assessment tools:

1. Eight-item Interview to Differentiate Aging and Dementia (AD8)
2. Perceived Stress Scale (PSS)
3. University of California, Los Angeles (UCLA) Loneliness scale
4. PHQ-9 (Patient Health Questionnaire-9)
5. GAD-7 (General Anxiety Disorder-7)

3.1.1 Step 1. Checklist items and answers

Topic A. Demographic Characteristics

Metric and Answer Options

- A1. Gender
- Male: 0 points
- Female: 1 point
- Non-binary: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- A2. Education Level
- Illiterate (<3 years of education): 3 points

- Primary school (3-6 years): 2 points
- Secondary school (7-12 years): 1 point
- Tertiary education (>12 years): 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- A3. Income Level

- No/Low: 2 points
- Moderate: 1 point
- High: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- A4. Age

- 70 or less years old: 2 points
- 71 or more years old: 1 point
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- A5. Area of Residence

- Rural (Low population density, natural environment, limited amenities and infrastructure): 2 points
- Semi-rural (Moderate population density, balanced amenities, mixed residential-commercial areas): 1 point
- Urban (High density, extensive amenities, developed infrastructure): 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- A6. Living Arrangement

- Alone: 2 points
- With family/others: 0 points
- In a care facility: 1 point
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- A7. Minority Status

- Yes: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- A8. Community disaster impact

- Not particularly: 0 points
- Natural disaster (e.g., fire, flood): 1 point
- Unnatural disaster (e.g., war, conflict): 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

Topic B. Health & Comorbidities

Metric and Answer Options

- B1. Number of Chronic Illnesses

- 1-3 diseases: 1 point
- 4 or more: 2 points
- No diseases: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- B2. Number of Medications Taken

- No medications: 0 points
- 1-2 medications: 1 point
- 3-5 medications: 2 points
- >5 medications: 3 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- B3. Mobility

- Able to drive: 0 points
- Unable to drive (no aids): 1 point
- Using mobility aids: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- B4. Mental Disorder Diagnosis

- Yes: 2 points
- No: 0 points
- Maybe: 1 point
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- B5. Family History of Mental Health Disorders

- Yes: 2 points

- No: 0 points
- Maybe: 1 point
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- B6. Mental Health Professionals

- Yes: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- B7. Pain Intensity and Frequency

- No: 0 points
- Mild: 1 point
- Moderate: 2 points
- Severe: 3 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- B8. Hearing Impairment

- Yes: 2 points
- No: 0 points
- Maybe: 1 point
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- B9. Visual Impairment

- Yes: 2 points
- No: 0 points
- Maybe: 1 point
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

Topic C. Cognitive & Emotional Function**

Metric and Answer Options

- C1. Memory Problems

- Yes: 2 points
- Occasionally: 1 point
- Not really: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- C2. Use of Money
- Independent: 0 points
- Needs assistance: 1 point
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- C3. Loss of Loved One/Close Relative
- Yes: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- C4. Difficulty Making Decisions
- Yes: 2 points
- No: 0 points
- Maybe: 1 point
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- C5. Trauma

- Yes: 2 points
- Possible: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- C6. Speech/Language Difficulties

- Yes: 2 points
- Possible: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- C7. Confusion/Delirium

- Yes: 2 points
- Possible: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- C8. Hallucinations

- Yes: 2 points
- Possible: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

Topic D. Sleep & Nutrition

Metric and Answer Options

- D1. REM Sleep Disorder
- Yes: 2 points
- Possible: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- D2. Insomnia
- Yes: 2 points
- Possible: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- D3. Over-sleep
- Yes: 2 points
- Possible: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- D4. Under-sleep
- Yes: 2 points
- Possible: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- D5. Weight Changes (Loss)
- Yes: 2 points
- Possible: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- D6. Weight Changes (Gain)
- Yes: 2 points
- Possible: 1 point
- No: 0 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- D7. Dietary Habits
- Optimal/Close to optimal: 0 points
- Suboptimal: 1 point
- Poor/Very poor: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

Topic E. Community & Lifestyle

Metric and Answer Options

- E1. Supportive Network

- Yes: 0 points
- A few: 1 point
- Not really: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- E2. Frequency of Feeling Lonely
- Never/Rarely: 0 points
- Sometimes: 1 point
- Often: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- E3. Exchange of Visits
- Never/Rarely: 0 points
- Sometimes: 1 point
- Often: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- E4. Alcohol Consumption
- Never/Rarely: 0 points
- Occasionally: 1 point

- Regularly: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- E5. Tobacco Use
- Never: 0 points
- In the past: 1 point
- Current: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- E6. Illicit Drug Use
- Never: 0 points
- In the past: 1 point
- Current: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- E7. Engagement in Hobbies or Leisure Activities

- Never/Rarely: 0 points
- Sometimes: 1 point
- Often: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- E8. Physical Exercise Routine
- Moderate/High: 0 points
- Light: 1 point
- Sedentary: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

Topic F. Personal Space & Environment

Metric and Answer Options

- F1. Cleanliness of Living Space
- Clean: 0 points
- Moderately clean: 1 point
- Cluttered: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- F2. Organization/Tidiness of Personal Belongings

- Organized: 0 points
- Moderately organised: 1 point
- Disorganized: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- F3. Hoarding Tendencies

- Yes: 2 points
- No: 0 points
- Maybe: 1 point
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

- F4. Personal Hygiene and Appearance

- Good: 0 points
- Average: 1 point
- Poor: 2 points
- Not able to assess/ Unwillingness to respond: Exclude question from algorithm

Explanation

Each severity score reflects the severity of the answer option, with higher scores indicating greater severity. "Not able to assess" options are excluded from the severity score calculation to ensure an accurate assessment based on available data. This option is included because, in some cases, symptoms cannot be assessed. Additionally, a "maybe" option is available to capture any uncertainties a professional might have, allowing these responses to still be scored.

All possible symptoms of an active mental disorder are grouped in Topic C, indicated with ** above. In contrast, Topics A, B, D, E, and F contain only risk factors.

3.1.2 Step 2. Further Assessments

Further assessment, if needed, will appear at the end of the checklist with the following five assessment tools:

1. Eight-item Interview to Differentiate Aging and Dementia (AD8)
2. Perceived Stress Scale (PSS)
3. University of California, Los Angeles (UCLA) Loneliness scale
4. PHQ-9 (Patient Health Questionnaire-9)
5. GAD-7 (General Anxiety Disorder-7)

The questions provided below were formulated based on established practices for sensitive interviewing of older adults. Research has shown that clear, respectful communication is essential when discussing personal and potentially sensitive topics with older adults (National Institute on Aging, 2019). Additionally, studies emphasise the importance of using open-ended questions and providing context to ensure that older adults feel comfortable and understood (American Psychological Association, 2018). These prompts are designed to guide nurses in effectively gathering the necessary information while maintaining a respectful and supportive interaction.

It should be noted that although patients may provide their own opinions, especially on autobiographical questions, the nurse's judgement often predominates in selecting questionnaire answers, particularly when their judgement is considered more objective. This is particularly the case with items in topics C and F.

3.1.3 Topic A. Demographic Characteristics

A1. Gender

- Hover Information: "Can you please tell me your gender? If you prefer not to answer, that's completely fine."

A2. Education level

- Hover Information: "What is the highest level of education you have completed (count the years)?"

A3. Income level

- Hover Information: "Could you tell me about your current income level? Would you say it is on the no/low, moderate, or high range? If you prefer not to answer, that's fine too."

A4. Age

- Hover Information: "How old are you?"

A5. Area of residence

- Hover Information: "Can you tell me about the area where you live? Is it urban, suburban, or rural?"

A6. Living arrangement

- Hover Information: "Who do you live with? Do you live alone, with family, or in a care facility?"

A7. Minority status

- Hover Information: "Are you a member of a group that is smaller in number or has less representation compared to the larger community (e.g., due to your ethnicity, religion, etc)?"

A8. Community disaster impact

- Hover Information: "Has your community experienced any disasters recently, such as natural disasters like fires or floods, or unnatural disasters like wars or conflicts?"

Topic B. Health & Comorbidities

B1. Number of chronic illnesses

- Hover Information: "Can you please let me know of any chronic illnesses you have been diagnosed with (e.g., diabetes, cardiovascular diseases, pulmonary diseases, neurological disorders)?*Count the number of the diseases reported"

B2. Number of medications taken

- Hover Information: "How many medications do you currently take?"

B3. Mobility

- Hover Information: "How would you describe your mobility? Are you able to drive, do you use mobility aids, or are you unable to drive?"

B4. Mental disorder diagnosis

- Hover Information: "Have you ever been diagnosed with any mental health conditions such as depression, anxiety, or other?"

B5. Family history of mental health disorders

- Hover Information: "Has anyone in your family(incl. mom or dad) ever experienced symptoms like feeling very sad for a long period of time, irrational behaviours, or other signs that could indicate mental health issues?"

B6. Mental health professionals

-Hover Information: "Do you currently have a psychiatrist, neurologist, or psychologist?"

B7. Pain intensity and frequency

- Hover Information: "Can you describe the intensity and frequency of any pain you experience? Would you say it is none, mild, moderate, or severe?"

B8. Hearing impairment

Hover Information: "Do you experience difficulty with your hearing, such as trouble hearing conversations or sounds?"

B9. Visual impairment

Hover Information: "Do you experience vision problems, such as difficulty seeing objects or reading?"

Topic C. Cognitive & Emotional Function

C1. Memory problems

Hover Information: “Have you faced any difficulties with your memory in the past year, such as forgetting where you put items or leaving tasks incomplete?”

C2. Use of money

Hover Information: "Do you handle your finances independently, or do you require assistance managing your money?"

C3. Loss of loved one/close relative

Hover Information: "Have you recently experienced the passing of a loved one or close relative (within the past year)?"

C4. Difficulty making decisions

Hover Information: "Do you find it challenging to make decisions in your daily life, such as deciding what to eat, what clothes to wear, or going to the doctor?"

C5. Trauma

- Hover Information: "Have you gone through any very difficult or upsetting events in your lifetime including abuse, violence, trauma? You do not have to explain what happened.”

C6. Speech/language difficulties

-Hover Information: "Do you experience any challenges with speaking or understanding language?"

C7. Confusion/delirium

-Hover Information: "Do you ever feel confused or disoriented?"

C8. Hallucinations

-Hover Information: "Do you experience seeing or hearing things that others do not?"

Topic D. Sleep & Nutrition

D1. REM Sleep disorder

- Hover Information: "Do you experience acting out vivid dreams, often by talking, yelling, or moving during sleep?"

D2. Insomnia

- Hover Information: "Do you experience insomnia (difficulty falling or staying asleep)?"

D3. Over-sleep

- Hover Information: "Do you regularly sleep more than 8 hours per night?"

D4. Under-sleep

- Hover Information: "Do you regularly sleep less than 5 hours per night?"

D5. Weight changes (loss)

- Hover Information: “Have you unintentionally lost 4.5 kg or more over the last 12 months?"

D6. Weight changes (gain)

- Hover Information: “Have you unintentionally gained 4.5 kg or more over the last 12 months?”

D7. Dietary habits

- Hover Information: “The Mediterranean diet is characterised by specific food groups and portions per week:

- *Legumes (e.g., beans, lentils): 2-3 servings*
- *Dairy (e.g., yoghourt, cheese): 2-3 servings*
- *Fish (e.g., salmon, sardines): 2-3 servings*

- *Meat and poultry (e.g., chicken, beef): 2-3 servings*
- *Fruit (e.g., apples, oranges): 2-3 servings*

Please rate your current diet compared to this:"

Topic E. Community and Lifestyle

E1. Supportive network

- Hover Information: "Do you have friends or people you can rely on for support?"

E2. Frequency of feeling lonely

- Hover Information: "How often do you feel lonely?"

E3.Exchange of visits

- Hover Information: "Do you engage in visits or receive visitors often, sometimes or never/rarely?"

E4. Alcohol consumption

- Hover Information: "How often do you consume alcohol? Would you say never, occasionally, or regularly?"

E5. Tobacco use

- Hover Information: "Do you use tobacco? If so, do you currently use it, have you used it formerly, or never?"

E6. Illicit drug use

- Hover Information: "Have you used illicit drugs? If so, do you currently use them, have you used them formerly, or never?"

E7. Engagement in hobbies or leisure activities

- Hover Information: "How often do you engage in hobbies or leisure activities (singing, gardening, dancing, knitting, other)? Would you say regularly, occasionally, or rarely?"

E7. Physical exercise routine

- Hover Information: "How would you describe your physical exercise routine (e.g., walking, running, swimming, gardening)? Is it light, moderate/high, or mostly sedentary?"

Topic F. Personal Space & Environment

F1. Cleanliness of living space

- Hover Information: "How clean is your living space? Would you say it's clean, moderately clean, or cluttered?"

F2. Organisation/tidiness of personal belongings

- Hover Information: "How would you describe the organisation and tidiness of your personal belongings? Are they organised, moderately organised, or disorganised?"

F3. Hoarding tendencies

Hover Information: "Do you find it challenging to discard items and accumulate things beyond what's needed?"

F4. Personal hygiene and appearance

Hover Information: "How comfortable do you feel about your personal hygiene and appearance? Would you describe it as good, average, or poor?"

4 Field of application

This screening tool is specifically designed for use in a variety of healthcare settings, including home care visits, residential care facilities, and remote consultations via telephone or teleconferencing. It addresses the needs of older patients by providing a structured, integrated approach to assessment across multiple domains. The tool is particularly useful in-home care settings, where direct interaction with patients allows for comprehensive data collection. In inpatient settings, it helps healthcare professionals conduct thorough assessments to support patient care planning and management. For remote consultations, such as telephone or teleconferencing, the tool provides a structured framework for assessing patient health and well-being remotely.

4.1 Ethics Considerations

Ethical considerations are of primary importance in the application of this assessment tool in various healthcare settings. First, patient data is not stored in any form after the

assessment is completed, ensuring confidentiality and privacy. Second, question prompts have been incorporated to standardize data collection procedures, thereby increasing the consistency and accuracy of the assessment process. The latest

standards and guidelines were consulted in the development of this tool to ensure sensitivity in asking potentially sensitive questions across different cultural backgrounds. Healthcare professionals will obtain informed consent from patients before proceeding with the assessment, ensuring transparency and respect for patient autonomy. It is important to note that this tool is not a medical instrument and is intended for informational purposes only. Its use should be complementary to clinical judgement and professional assessment in health care practice. In addition, the tool will be translated into all consortium languages to facilitate accessibility and cultural appropriateness in all participating countries. Interventions suggested based on assessment results include recommendations for appropriate healthcare services and resources, tailored to the healthcare system and cultural context of each country.

5 Technical requirements

5.1 User-friendly features

The screening tool will integrate user-friendly features to enhance efficiency and usability for nurses and is designed to offer an intuitive interface for easy navigation, providing quick access to a range of validated screening tools across psychosocial needs, medical conditions, and care resources. Nurses will be able to generate customised reports summarising assessment results and recommendations, with the option to add patient identifiers for confidentiality and personalised care planning.

Upon completion, nurses will be able to instantly print or download PDF reports, facilitating the provision of tangible summaries and recommendations to patients and caregivers. Stringent data security measures ensure patient confidentiality and compliance with GDPR and other regulations. Comprehensive training and ongoing support will empower nurses to proficiently use the screening tool, maximising its functionalities during patient interactions. Designed primarily for mobile use, the screening tool will support seamless assessments during home visits or in various healthcare settings using tablets or smartphones. Nurses will be enabled to provide feedback on usability and effectiveness, facilitating continuous improvement and adaptation to user needs. The screening tool will employ a streamlined process for quick and efficient completion of assessments, accommodating varying patient care scenarios by allowing nurses the flexibility to conduct assessments later or independently as needed.

The tool is designed to be quick and flexible, allowing nurses to select which domains to complete based on their assessment needs. If a thorough assessment of all topics is conducted, the estimated total time to complete is approximately 10-15 minutes after as it was shown after internal paper testing. This ensures that the assessment process is efficient while accommodating various levels of detail based on individual patient needs and the nurse's discretion.

5.2 Design of the digital screening tool

The screening tool will be consisted of a dashboard, the checklist module, the reasoning module, the reporting module, and the assessment module. Figure 1 shows the screening tool's various modules and workflow.

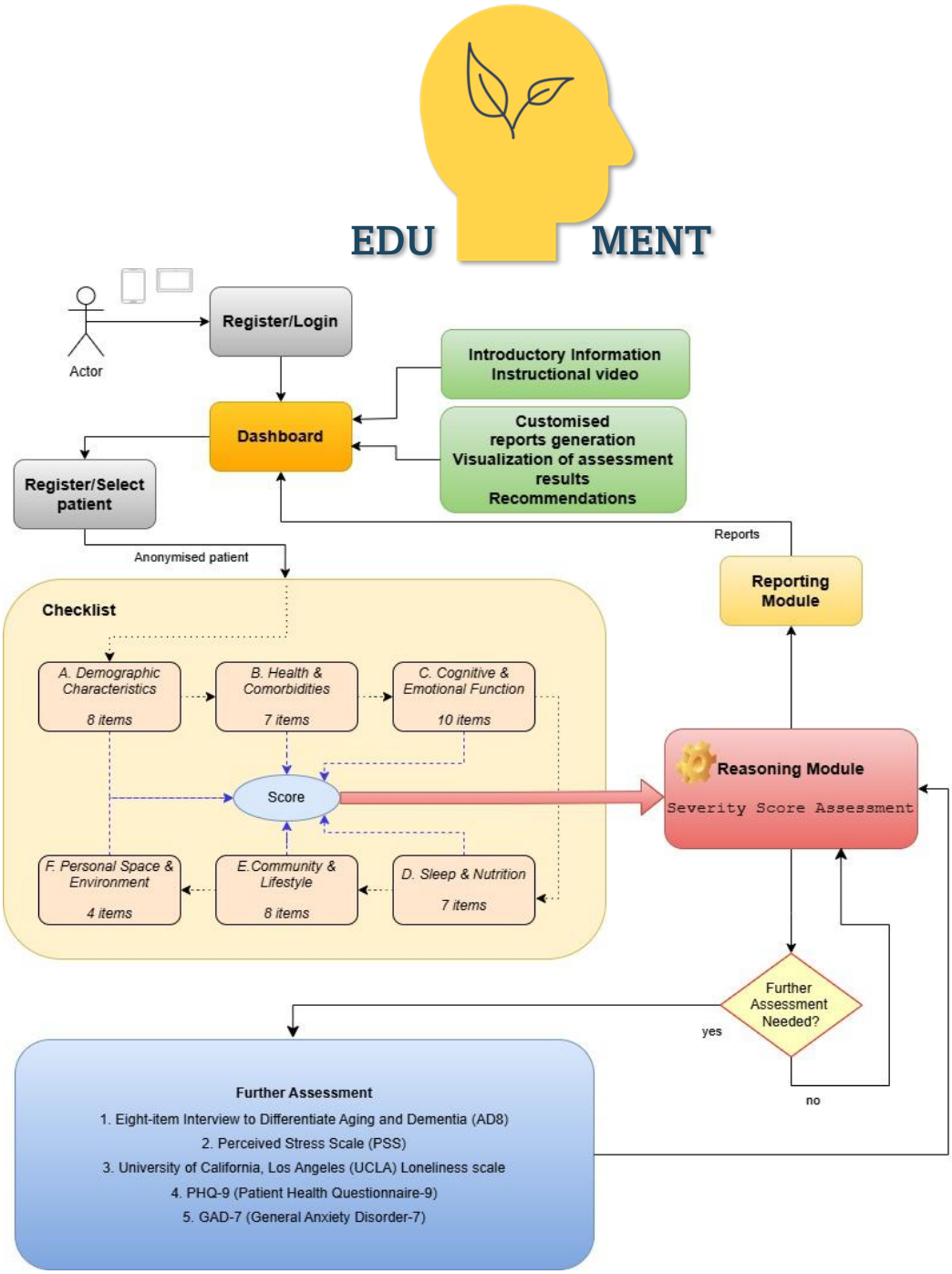

Figure 1 Screening tool's modules and workflow

RNs (or users in the remainder of this section) will register to the tool by submitting a valid email and a secure password. Upon registration and login, they will be navigated to the dashboard. The dashboard will provide the main navigation instrument to the different modules of the tool. Upon first login, the users will be prompted with introductory information to read and an instructional video to watch. They will be able to go back to these informational artifacts at any moment.

Using the dashboard, the user is able to register a patient. The patient is registered in an anonymised manner, meaning that no identifiable information is provided to the tool by the user. A patient is uniquely and anonymously identified by the system via a unique identifier. No names or any other personal information is used or stored in the tool. A

user will be able to register multiple patients, each of which will be accessible only by him/her.

After registering patients, a user must select a patient to proceed to the checklist module. The checklist module implements the 44 items in the six major topics. Upon completion of each item, its respective score is stored in the tool's database. In this manner, each item's score, as well as the entire Topic's score are always available for retrieval and/or further processing. The processing of the items' and the Topics' scores is being conducted by the reasoning module. The reasoning module is able to compute the *severity score* based on which the tool will decide whether further assessment is needed for the patient. If further assessment is needed for the patient, the user (RN) will proceed to the assessment module where the 5 extra tools will be available in the form of questionnaires.

Reporting Module: the user using the dashboard will be able to use the reporting module in order to generate customised reports for their patients, summarising assessment results and recommendations, with the option to add patient identifiers for confidentiality and personalised care planning. User are also able to instantly print or download PDF reports, facilitating the provision of tangible summaries and recommendations.

5.3 Technical Development

For the development of the screening tool, state-of-the-art, open-source web development technologies will be used, aiming for high responsiveness, efficiency, effectiveness and ease-of-use. The focus will be on mobile devices, as the use of the tool in mobile settings is of major importance. The tool will be hosted at UCY servers and will be based on the WordPress CMS platform. On top of this platform, the necessary customised plugins will be developed to offer the needed functionality.

6 Evaluation and development requirements

The screening tool will be evaluated with structured testing with 30 RNs in Austria, Cyprus, and Slovenia, representing both home care and long-term care settings. Participants will receive a guided demonstration of the tool and will be asked to provide detailed feedback via an evaluation form. The evaluation form will assess aspects such as usability, content relevance, clarity, and perceived usefulness in real-world care settings. The evaluation process aims to get both qualitative and quantitative data. Semi-

structured interviews or focus groups may be conducted to gather the insights into nurses' experience and complete understanding of the tool's functionality, strengths, and limitations. Feedback collected during the evaluation will be analysed and shared with all project consortium and the technical development team at the UCY, who are responsible for the digital version of the tool. The outcomes will show improvements to the content of the tool and will ensure alignment with nurses' needs and workflows.

Additionally, specific indicators will be used to evaluate the tool's performance, including:

- Time required for completion *(target ≤15 minutes)*
- Content Relevance and Clarity
- User satisfaction and confidence in using the tool *(hardcopy first and then the digital version)*
- Ease of navigation and mobile usability *(when the digital version will be ready)*

The tool's final version will integrate this feedback and address any issues or gaps identified during testing. The results will be also used in the WP 4, where training modules will be developed and refined based on the evaluation findings to ensure nurses are fully supported in using the tool effectively. To support long-term sustainability and scalability, the evaluation process will also include recommendations for:

- Integration into existing digital systems
- Language localization
- Ongoing user support and updates

7 References

Covinsky, K. E., Pierluissi, E., & Johnston, C. B. (2011). Hospitalization-associated disability:"She was probably able to ambulate, but I'm not sure". *Jama*, *306*(16), 1782-1793. Zisberg, A., Gur-Yaish, N., & Shochat, T. (2010). Contribution of routine to sleep quality in community elderly. *Sleep*, *33*(4), 509-514.

Jeste, D. V., Blazer II, D. G., Buckwalter, K. C., Cassidy, K. L. K., Fishman, L., Gwyther, L. P., ... & Feather, J. (2016). Age-friendly communities initiative: public health approach to promoting successful aging. *The American Journal of Geriatric Psychiatry*, *24*(12), 1158-1170.

Lorant, V., Deliège, D., Eaton, W., Robert, A., Philippot, P., & Ansseau, M. (2003). Socioeconomic inequalities in depression: a meta-analysis. *American journal of epidemiology*, *157*(2), 98-112.

Luppa, M., Sikorski, C., Luck, T., Ehreke, L., Konnopka, A., Wiese, B., ... & Riedel-Heller, S. G. (2012). Age-and gender-specific prevalence of depression in latest-life–systematic review and meta-analysis. *Journal of affective disorders*, *136*(3), 212-221

Lyketsos, C. G. (2007). Neuropsychiatric symptoms (behavioral and psychological symptoms of dementia) and the development of dementia treatments. *International Psychogeriatrics*, *19*(3), 409-420.

Lyketsos, C. G., Lopez, O., Jones, B., Fitzpatrick, A. L., Breitner, J., & DeKosky, S. (2002). Prevalence of neuropsychiatric symptoms in dementia and mild cognitive impairment: results from the cardiovascular health study. *Jama*, *288*(12), 1475-1483.

Maher, R. L., Hanlon, J., & Hajjar, E. R. (2014). Clinical consequences of polypharmacy in elderly. *Expert opinion on drug safety*, *13*(1), 57-65.

Salk, R. H., Hyde, J. S., & Abramson, L. Y. (2017). Gender differences in depression in representative national samples: Meta-analyses of diagnoses and symptoms. *Psychological bulletin*, *143*(8), 783.

Tsang, A., Von Korff, M., Lee, S., Alonso, J., Karam, E., Angermeyer, M. C., ... & Watanabe, M. (2008). Common chronic pain conditions in developed and developing countries: gender and age differences and comorbidity with depression-anxiety disorders. *The journal of pain*, *9*(10), 883-891.